

Claims

Sub A<sup>2</sup> 1. A heat exchange assembly including:-  
an internal passageway formed between a pair of  
5 spaced substantially parallel internal sheets, and  
respective external passageways formed between  
each said internal sheet and a respective external  
sheet spaced from and substantially parallel to a  
respective internal sheet;

10 said pair of internal sheets at the ends of said  
internal passageway extending beyond said external  
sheets at the ends of said external passageways  
thereby facilitating fusion welding to said internal  
sheets at the ends of said internal passageway.

15 2. A heat exchange assembly as claimed in claim 1,  
and including:-

spacing ribs between said sheets and forming with  
said sheets a plurality of fluid conduits within said  
20 internal passageway and a plurality of external  
conduits within said external passageways.

Sub A<sup>3</sup> 3. A heat exchange assembly as claimed in claim 2,  
and including:-

25 fluid inlet means at one end of said internal  
passageway or said external passageways for the inflow  
of fluid in the heat exchange assembly, and

30 fluid outlet means at the other end of said  
internal passageway or said external passageways for  
the outflow of fluid from the heat exchange assembly.

4. A heat exchange assembly as claimed in claim 3,  
and including:-

35 gas inlet means at one end of the other of said  
internal passageway or said external passageways for  
the inflow of gas to the heat exchange assembly, and  
gas outlet means at the other end of the other of

Sub A<sup>3</sup>   
said internal passageway or said external passageways  
for the outflow of gas from the heat exchange  
assembly;

5       whereby said internal passageway or said external  
passageways is/are adapted to receive or contain a gas  
for effecting heat exchange with a fluid in the other  
of said internal passageway or said external  
passageways.

10     5. A heat exchange assembly as claimed in claim 3,  
said assembly constituting a panel sealed at the sides  
thereof by said spacing ribs and open at the ends  
thereof to provide access to said conduits which  
15     extend from one end of the panel to the other end  
thereof.

6. A heat exchange assembly as claimed in claim 5,  
and including an inlet manifold and an outlet manifold  
at respective ends of said panel.

20     7. A heat exchange assembly as claimed in claim 6,  
wherein said inlet manifold and said outlet manifold  
include said fluid inlet means and said fluid outlet  
means respectively.

25     8. A heat exchange assembly as claimed in claim 7,  
wherein said inlet manifold and said outlet manifold  
include said gas inlet means and said gas outlet means  
respectively.

Sub A<sup>4</sup> <sup>30</sup>   
9. A heat exchange assembly as claimed in claim 3,  
and including:-

35       pressure relief means for relieving the pressure  
in said fluid passageway generated by heating fluid  
therein.

10. A heat exchange assembly as claimed in claim 9,

wherein said pressure relief means is a riser positioned in said fluid inlet and/or fluid outlet means.

- 5 11. A heat exchange assembly including:-  
an internal passageway formed between a pair of  
spaced substantially parallel internal sheets, and  
respective external passageways formed between  
each said internal sheet and a respective external  
10 sheet spaced from and substantially parallel to a  
respective internal sheet;  
fluid inlet means at one end of said internal  
passageway or said external passageways for the inflow  
of fluid in the heat exchange assembly;  
15 fluid outlet means at the other end of said  
internal passageway or said external passageways for  
the outflow of fluid from the heat exchange assembly;  
gas inlet means at one end of the other of said  
internal passageway or said external passageways for  
20 the inflow of gas to the heat exchange assembly, and  
gas outlet means at the other end of the other of  
said internal passageway or said external passageways  
for the outflow of gas from the heat exchange  
assembly;  
25 whereby said internal passageway or said external  
passageways is/are adapted to receive or contain a gas  
for effecting heat exchange with a fluid in the other  
of said internal passageway or said external  
passageways.

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Sub A5  
12. A roofing panel incorporating a heat exchange  
assembly, said roofing panel including:-

- 35 an internal fluid passageway formed between a  
pair of spaced substantially parallel internal sheets  
for the passage therethrough of a fluid;  
respective external passageways formed between  
each said internal sheet and a respective external

sheet spaced from and substantially parallel to a respective internal sheet, and

spacing ribs between said sheets and forming with  
said sheets a plurality of fluid conduits within said  
5 fluid passageway and a plurality of external conduits  
within said external passageways;

said pair of internal sheets at the ends of said internal passageway extending beyond said external sheets at the ends of said external passageways thereby facilitating fusion welding to said internal sheets at the ends of said internal passageway, said panel being sealed at the sides thereof by said spacing ribs and being open at the ends thereof to provide access to said conduits which extend from one end of the panel to the other end thereof.

13. A manifold for connection to a panel as claimed in claim 12, said manifold including:-

fluid communication means for the inflow or  
20 outflow of fluid to or from the fluid conduits, and  
gas communication means for the inflow or outflow  
of gas to or from the external conduits.

14. A manifold as claimed in claim 13, and  
25 including:-

receiving means for receiving the internal sheets and the external sheets whereby said fluid communication means and said gas communication means are sealingly connected to the fluid passageway and the external passageways respectively.

15. A manifold as claimed in claim 13, wherein said manifold is an extrusion and said fluid communication means and said gas communication means are channels in said extrusion.

16. A heat exchange panel including:-

Sub A<sup>1</sup>  
an internal fluid passageway formed between a pair of spaced substantially parallel internal sheets for the passage therethrough of a fluid;

5 respective external passageways formed between each said internal sheet and a respective external sheet spaced from and substantially parallel to a respective internal sheet;

spacing ribs between said sheets and forming with said sheets a plurality of fluid conduits within said fluid passageway and a plurality of external conduits 10 within said external passageways, and

manifold means including fluid communication means for the inflow or outflow of fluid to or from the fluid conduits, and gas communication means for 15 the inflow or outflow of gas to or from the external conduits;

wherein said panel is sealed at the sides thereof by said spacing ribs and is open at the ends thereof to provide access to said conduits which extend from 20 one end of the panel to the other end thereof.